LAWRENCE LIVERMORE
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, May 16-20, 2011

Coming to a medical center near you

The Lab's Roger Werne speaks to KNTV reporter Laura Garcia-Cannon.

Roger Werne of the Lab's Industrial Partnerships Office appeared live on KNTV Thursday in downtown Livermore to discuss some of the medical advancements that were born out of the Laboratory.

Werne explained how the Lab's main mission is national security, but many medical advancements have sprung up from the nuclear weapons program.

One such treatment is proton therapy, which is licensed to a private company and could be in hospitals soon. In the treatment, proton beams deposit almost all of their energy on their target, with a low amount of radiation deposited in tissues from the surface of the skin to the front of the tumor, and almost no "exit dose" beyond the tumor. This property enables doctors to hit tumors with higher, potentially more effective radiation doses than is possible with gamma radiation.

To view the full interview, see the video.

Streamlining data centers

An LLNL cluster in the data center

The Laboratory's Steve Devine joined fellow network engineer Dave Sipes to build a consolidated data center four years ago to improve capacity, heating and cooling, and bandwidth.

"We had an aging data center that needed to be upgraded to consolidate the multiple small closets scattered all over the campus," says Devine, a network engineer for the institutional data center.

"As we built the data center, one of our goals was to collapse these smaller closets into the data center and utilize that single footprint in a more efficient way," he said.

The institutional data center supports DNS, e-mail, Active Directory and the main applications and services that help LLNL run its affairs.

Instead of the scattered systems throughout the Laboratory, Devine and Sipes built the new data center in quadrants.

To read more, go to the Web.

New form of diamond is lighter than ever

A diamond aerogel has been hammered out of a microscopic anvil.
Image by Kwei-Yu Chu/LLNL

By combining high pressure with high temperature, Laboratory esearchers have created a nanocyrstalline diamond aerogel that could improve the optics for something as big as a telescope or as small as the lenses in eyeglasses.

Aerogels are a class of materials that exhibit the lowest density, thermal conductivity, refractive index and sound velocity of any bulk solid. Aerogels are among the most versatile materials available for technical applications due to their many exceptional properties. This material has chemists, physicists, astronomers and materials scientists utilizing its properties in myriad applications, from a water purifier for desalinizing seawater to installation on a NASA satellite as a meteorite particle collector.

In new research, a Livermore team created a diamond aerogel from a standard carbon-based aerogel precursor using a laser-heated diamond anvil cell.

A diamond anvil cell consists of two opposing diamonds with the sample compressed between them. It can compress a small piece of material (tens of micrometers or smaller) to extreme pressures, which can exceed 3 million atmospheres.

To read more, go to the Web.

National summit focuses on innovation in clean energy

White House Science Adviser John Holdren and LLNL Deputy Director for Science and Technology Tomás Díaz de la Rubia. Photos courtesy of Kevin Allen.

The United States needs to move ahead in the clean energy arena by innovating at the intersection of science and technology, policy and economics.

That was the message this week at the National Summit on Advancing Clean Energy Technologies in Washington, D.C. Organized by the Howard Baker Forum, the Bipartisan Policy Center and the Laboratory, the conference hosted a number of participants from the Obama Administration, Capitol Hill, science, academia and industry.

During Monday's keynote speech, White House Science Adviser John Holdren said the country cannot compete in the global energy market by living in a business-as-usual environment.

"In the energy outlook for 2011, renewables expand significantly, but fossil fuel dominance persists overwhelmingly," he said. Holdren acknowledged that advancement in energy technologies is not a matter of running out of energy or money, but rather the economic, political and environmental risks of fossil fuel dependence using the current technologies. "The solutions currently available are inadequate," he said.

To read more, go to the Web. https://www.llnl.gov/news/aroundthelab/2011/May/ATL--51811_summit.html

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LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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